

Table 3.2 Sample Analytical Results Summary - Mine Soils
Morning Star Mine
Mojave National Preserve, California

Location	Sample Date	Total CN mg/kg	WAD CN mg/kg	Sb mg/kg	As mg/kg	Ba mg/kg	Be mg/kg	Cd mg/kg	Cr mg/kg	Co mg/kg	Cu mg/kg	Pb mg/kg	Hg mg/kg	Mo mg/kg	Ni mg/kg	Se mg/kg	Ag mg/kg	Tl mg/kg	V mg/kg	Zn mg/kg	pH s.u.	
Heap 1 - NE end @ 12"	May-01	nd	1.1	nd	nd	34	0.2	nd	1.1	4.7	120	360	nd	3.3	nd	nd	nd	nd	nd	30	9.76	
Heap 1 - NW end @ 12"	May-01	nd	1.7	nd	nd	57	0.4	1.7	nd	2.9	220	300	0.03	9.0	5.0	nd	nd	nd	nd	54	9.67	
Heap 2 - west end @ 12"	May-01	1.3	0.6	nd	nd	57	0.5	2.8	nd	4.1	180	970	nd	5.5	nd	nd	2.9	nd	1.6	53	10.10	
Heap 2 - east end @ 12"	May-01	5.7	nd	nd	nd	20	0.3	1.9	nd	4.9	95	700	nd	3.1	nd	nd	nd	nd	nd	67	10.10	
South side of Pad 2	Feb-99	14	12	nd	nd	20	nd	nd	1.5	6.6	130	450	nd	nd	nd	nd	nd	nd	nd	41	9.70	
	Mar-00	2.6	0.7	nd	nd	24	0.4	1.3	nd	7.2	136	1160	0.10	3.6	nd	nd	nd	nd	nd	37	9.94	
	May-01	6.2	0.8	nd	nd	25	0.3	1.6	1.4	3.3	130	560	nd	4.4	nd	nd	nd	nd	nd	54	9.19	
Pad 2 ² south of slope failure	Mar-00	nd	- ¹	nd	nd	17	0.2	nd	1.6	1.3	9	69	nd	nd	nd	nd	nd	nd	4.7	16	9.70	
	May-01	nd	nd	nd	nd	29	0.3	nd	3.7	2.1	3	nd	nd	3.7	3.6	nd	nd	nd	9.4	16	9.76	
Pad 2 ³ east of slope failure	Mar-00	nd	- ¹	nd	nd	19	0.3	nd	2.4	1.0	4	16	nd	nd	nd	nd	nd	nd	8.9	15	9.62	
Waste rock pile	Mar-00	nd	- ¹	nd	nd	37	0.4	1.8	2.2	4.1	32	350	0.06	3.1	3.3	nd	nd	nd	2.3	70	9.02	
	May-01	0.9	nd	nd	nd	120	1.0	3.8	1.0	11.0	140	540	nd	4.0	5.3	nd	0.87	13.0	1.1	51	9.08	
Drainage below waste rock pile	May-01	nd	- ¹	nd	nd	39	0.5	nd	1.6	2.5	9	110	nd	nd	nd	nd	nd	nd	9.2	52	9.02	
Pad 1 ⁴ downgradient	Mar-00	nd	- ¹	nd	nd	15	0.1	nd	1.5	2.4	8	22	nd	nd	nd	nd	nd	nd	5.4	11	9.28	
	May-01	nd	nd	nd	nd	40	0.3	nd	3.4	2.6	27	52	nd	2.3	nd	nd	nd	nd	12.0	25	9.91	
Established Regulatory Limits																						
COPC? ^a		Yes	Yes	No ^b	Yes ^c	No	No	Yes	No	No	Yes	Yes	No	Yes	No	No ^d	Yes	Yes	No	No		
Background Concentrations ^a		na	na	0.16 - 0.33	1 - 3.8	571 - 710	0.68 - 1.91	0.05 - 0.32	23 - 67	8 - 11.6	11.3 - 15.1	13.2 - 26.7	0.1 - 0.32	0.1 - 1	12 - 30	0.015 - 0.02	0.12 - 0.28	0.38 - 0.77	74 - 85	92 - 154	na	
USEPA Region 9 Soil PRGs ^e		Industrial	35	35	820	2,200	810	64 ^f	100,000	76,000	750	610	10,000	41,000	10,000	10,000	10,000	130	14,000	100,000	na	
		Residential	11	11	31	0.39	5,400	150	9	30 ^f	4,700	2,900	400	23	390	150	390	390	5.2	550	23,000	na
LRWQCB WDRs ^g		2.5 ^h	0.5 ⁱ	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	na	
CA TTL ^j		--	--	500	500	10,000	75	100	2,500	8,000	2,500	1,000	2.0	3,500	100	100	500	700	2,400	5,000	na	
Detection Limits - Mar-00		<0.5	<6.0	<10.0	<1.0	<0.10	<1.0	<1.0	<1.0	<0.7	<1.0	<15.0	<0.02	<2.0	<3.0	<10.0	<0.7	<10.0	<1.0	<5.0		
Detection Limits - Jul-02		<0.5	<0.5	<5.1-5.8	<8.5-9.6	<0.85-0.96	<0.085-0.096	<0.85-0.96	<0.85-0.96	<0.59-0.67	<0.85-0.96	<6.4-7.2	<0.018-0.020	<1.7-1.9	<2.5-2.9	<8.5-9.6	<0.59-0.67	<8.5-9.6	<0.85-0.96	<1.7-1.9		

Total CN / WAD CN Total Cyanide / Weak Acid Dissociable Cyanide
mg/kg milligrams per liter (equivalent to parts per million)
< Not detected at indicated reporting limit
nd Not detected. Detection limit indicated in last row of table.
-- not established

^a Chemical Of Potential Concern if above background.
^b Detection limits were above the background range and regulatory limits. Analyte kept as COPCs.
^c Detection limits were above the background range, but below regulatory levels.
^d From: Bradford et al., 1996. Only data from San Bernadino County used.
^e From: USEPA, 2000a.
^f PRG for chromium VI presented. The California modified standard for Chromium VI is 0.16.
^g Lahontan Regional Water Quality Control Board waste discharge requirements for Morning Star Mine
^h Soluble Total Cyanide.
ⁱ Soluble WAD Cyanide. The WDR for Total cyanide after extraction of soluble WAD and total cyanide is 10.
^j California Total Threshold Limit Concentration

Sb Antimony
As Arsenic
Ba Barium
Be Beryllium
Cd Cadmium
Cr Chromium
Co Cobalt
Cu Copper
Pb Lead
Hg Mercury
Mo Molybdenum
Ni Nickel
Se Selenium
Ag Silver
Tl Thallium
V Vanadium
Zn Zinc

Shaded number indicates exceedence of established regulatory limit
¹ Total cyanide is non-detect, therefore WAD cyanide would also be non-detect.
² 20 feet below leach pad failure on south facing slope.
³ below leach pad failure on east facing slope.
⁴ runoff path near fence line.

Location	Sample Date	Total CN mg/kg	WAD CN mg/kg	Sb mg/l	As mg/l	Ba mg/l	Be mg/l	Cd mg/l	Cr mg/l	Co mg/l	Cu mg/l	Pb mg/l	Hg mg/l	Mo mg/l	Ni mg/l	Se mg/l	Ag mg/l	Tl mg/l	V mg/l	Zn mg/l	pH s.u.
Sludge from PSP ³	Jul-02	108	19.8	-	nd	nd	-	nd	nd	-	-	nd	nd	-	-	nd	nd	-	-	-	8.5
LRWQCB WDRs ^g		2.5 ^h	0.5 ⁱ		5			1	5			5	0.2			1	5.0				
Detection Limit		0.2	0.2	-	0.5	10		0.1	0.5			0.5	0.02			0.1	0.5				0.1

mg/l milligrams per liter

³ Sludge gold value 99 mg/kg.